

### **Remarks**

The Applicants thank the Examiner for the courtesy shown during the interview on November 5, 2004. It was agreed during the interview that claim amendments similar to those presented above (claims 1 and 7-10) would make the claims more clear and overcome the rejections under 35 U.S.C § 112 set forth in the last Official Action.

The claims are directed to a method of producing an aromatic compound isomer that is substituted with alkyl groups and/or halogen atoms. The process begins with a starting mixture or feed material that contains the aromatic compound isomer, as well as other isomers or components. The feed material can be obtained, for example, from an isomerization process, which are well known to those skilled in the art. Such a process is discussed in the background section of the application in connection with Japanese Patent Publication No. 469334/1992.

The starting mixture is subjected to an adsorptive separation step, which uses a zeolite-containing adsorbent and a desorbent. The adsorptive separation can be performed using a number of techniques, such as a moving bed process or a simulated moving bed process, the latter being shown in Fig. 1. Although these processes are well known in the art, they will briefly be explained here. A moving bed process can be demonstrated schematically using a rectangle divided into four (4) zones numbered I through IV from left to right. The solid phase (*e.g.*, zeolite adsorbent) can be considered to move from right to left, while the fluid phase (*e.g.*, desorbent) flows from left to right. (In a simulated moving bed process, the solid phase generally does not actually move.) The feed material or starting mixture is introduced in the middle of the rectangle between zones II and III. The feed material is then carried to the right into zone III by the fluid phase. As the feed moves through zone III, at least a portion of the desired isomer is adsorbed by the adsorbent. A portion of the fluid phase is then withdrawn as raffinate in between zones III and IV. Using *para*-xylene as an example

of the desired isomer to be separated, a portion of the *para*-xylene will generally be present in the raffinate along with other isomers (*e.g.*, *meta*- and *ortho*-xylene) and/or compounds that were not adsorbed by the solid phase. The separation of *para*-xylene is described in Example 1 in the specification.

Another portion of the *para*-xylene will be adsorbed by the adsorbent, which is flowing to the left into zones II and I. The desorbent is introduced at the beginning of zone I, where it begins its flow to the right. The desorbent removes the portion of the *para*-xylene from the adsorbent. The desorbent and *para*-xylene are then removed as an extract between zones I and II. Because not all of the desorbent need be removed between zones I and II, desorbent can also be present in the raffinate removed between zones III and IV.

Depending on the nature of desired isomer to be separated, the adsorbent and the desorbent, it is also possible to remove the desired isomer isolated in the raffinate, as in Example 2. In that case, the other isomers and compounds (and possibly a second portion of desired isomer) are removed in the extract. Again, processes involving moving beds or simulated moving beds are generally well known in the art.

It has been known that impurities, such as hydrochloric acid, can be formed during a previous isomerization process and can be present in the starting material. (*See Background of Specification.*) The inventors have surprisingly found that further impurities can be formed during adsorptive separation or distillation. The impurities formed during adsorptive separation or distillation can include high boiling point substances, such as dimers of aromatic compounds, oxygen-containing compounds and compounds having an aldehyde or carboxyl group. (*See paragraph bridging pages 14 and 15.*) Other impurities can include water, hydrochloric acid, phenols, and unsaturated hydrocarbon-containing compounds.

According to this invention, the impurity-carrying desorbent is separated from the desired isomer in the extract by, for example, distillation. Similarly, the desorbent in the raffinate can be separated from other isomers or components by distillation or the like. The desorbent from each distillation step is then processed to remove the impurities from the desorbent. The processes for removing impurities can include distillation, purging or adsorption to a solid adsorbent. Once the adsorbent has been processed to remove impurities, and a level of impurities below 1,000 ppm by weight is achieved, the desorbent is reintroduced into the adsorptive separation. If desired, the other isomers or components (separated from the raffinate) can also be reintroduced into the adsorptive separation as feed material, possibly after undergoing another isomerization process.

The product of the extract (or raffinate) separation represents the composition having the desired isomer. Once the steps recited in the claims have been performed, one achieves the desired isomer product. In light of the amendments to the claims and the comments set forth above, it is respectfully submitted that one skilled in the art would understand the scope of the subject matter claimed. Therefore, it is respectfully requested that the present rejections based on 35 U.S.C. § 112 be reconsidered and withdrawn.

New claims 11-17 have been added to the application to recite the above described steps with even greater clarity. Support for the new claims can be found, for example, in the original claims, Figures 1 and 4 and their written descriptions starting on page 13. No new matter has been added.

In addition, it is respectfully submitted that the claims are new and non-obvious over the prior art of record. The prior art does not teach or suggest the step of removing impurities from the desorbent prior to reintroducing the desorbent into the adsorptive separation. Nor does the prior art suggest such a step because it fails to even recognize the problem of generating impurities during adsorptive separation. The sharp distinctions between the claimed removal of impurities and the

known steps of recovery and reuse (or regeneration) of desorbent, as well as further reasons why the claims are patentable over the prior art, are more fully set forth in the Applicants' response of February 28, 2003, to which the Examiner's attention is again invited.

The Applicants respectfully submit that the entire Application is now in condition for allowance, which action is respectfully requested.

Respectfully submitted,



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